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THE FUTURE MECHANISM OF WARFARE

BY JOHN HAYS HAMMOND, JR.

While the nation is awake to the needs of defense, what constitutes defense is a matter of infinite dispute. There are some who believe that the investment of millions in capital ships is a grave mistake, in view of the potentiality of the submarine. There are others who imagine that the establishment of a standing army of several hundred thousand men will be an adequate safeguard against the attack of invading forces. It is a curious thing that such an ultra-technical question as defense should be in the hands of the people, and as long as it remains in the hands of the people, programmes of defense will be merely a matter of political compromise, and will never fulfill the scientific requirements that are imposed upon us through the organization of enemy forces.

In considering the question of the defense of the United States, there are two main propositions involved: First, the problem of what materials as weapons we need in our defenses; and second, what form of organization there shall be in the handling and development of these materials.

To best understand what future warfare is likely to bring about in the development of machines of destruction, it is necessary to study its history up to the present. It is an interesting thing that while man has shown infinite originality in the development of weapons, he has shown none in his methods of fighting. With all the vast changes in material that have taken place since early history, there has been, as Admiral Mahan said, no change in the principles of strategy. The same principles of the disposition and concentration of forces apply today as in the Napoleonic era. Coupled with this adherence to the old principles of handling forces is the maintenance of the same methods of destruction which were used by the earliest fighters. Artillery has developed from David's sling, through the *ballistae* of the Romans and the early cannons of the Middle Ages, to the fifteen-inch rifle mounted on the *Queen Elizabeth.* We are still battering each other with missiles, but with far more precision, greater range, greater rapidity of fire and greater destructive effect. It was a brilliant conception when the first man propelled his projectile by the explosive force of gun powder, yet years of experimenting and the work of hundreds of men were necessary to give to artillery the position it occupies in modern warfare. In the field artillery at Gettysburg the battery firing the greatest number of rounds during the day aggregated only 77 shots; while against a Liège fort the Austrian howitzers, hidden seven miles away, fired fifty tons of high explosive shells a minute. The effect of the howitzers was to kill seventy per cent of the garrison and seriously to injure the rest. It was an equally brilliant and revolutionary conception when some Dutch inventor of the Sixteenth Century conceived the idea of filling bullets with explosives so that, instead of merely perforating the target with a hole the diameter of the shot, there would result an explosion, the effect of which would be vastly more damaging. Today it is a curtain of fire, an iron curtain of thousands of explosive shells, that sweeps the enemy's lines. The gun is the supreme weapon of destruction.

In considering the specific problem of the defense of the United States, the naval question is perhaps of chief interest. It is upon the highroads of the oceans that we shall probably meet our enemy, and it will be a naval battle that will mark the opening of the campaign. Upon the seas we employ the same agency of destruction as on land, namely, the gun. About the gun has developed all the intricate mechanism of naval warfare. In order to use it effectively, since the days when ships grappled with each other and the conflict was hand to hand, man has sought for a suitable gun-platform. The super-dreadnought of today is the culmination of hundreds of types of ships, each in its way an experiment to better the naval gun-platform.

In the days of the sailing ships of the line, the problem of placing the ship or gun-platform in the most advantageous position to attack the enemy was determined largely by the direction of the wind. With the advent of steam this factor was eliminated, and with equally balanced fleets the issue today depends largely upon the ability of the opposing admirals. We started with over-armored ships of low free-board and poor seagoing qualities, carrying small armaments, and have now arrived at seaworthy, high-sided vessels of remarkable speed, carrying tremendous armaments. To produce these vessels, capable of keeping the seas and fighting under all conditions of weather, is a task not easily achieved by even the greatest naval designers. When one thinks of the thousands of tons of weight that a battleship carries in its large guns and turrets, and realizes that in a modern ship this weight is carried many feet above the water line, it seems astonishing that the vessels do not capsize. Moreover, when one considers that it is highly desirable to secure the greatest possible stability in these ships to attain accuracy of fire, then it is obvious how difficult must be the designing of the hull. Today this increase in armament is such that the weight of one shell of 13½-inch rifle on a modern dreadnought is greater than the weight of the whole broadside of Nelson's flagship, the *Victory.*

Positioning the guns of a ship so that the maximum may be brought to bear at a given time was also a question of great moment. Hundreds of new designs have been made in different types of ships, but the United States Navy solved the problem most effectively in positioning its large guns along the center line of the vessel, to allow their concentration in broadside fire. The cannon of the early fighting ships had but a limited scope of movement or arc of fire, and as early as the Spanish Armada the relative arc of fire of the ships' batteries proved of immense importance. Authorities now believe that one factor that contributed to England's victory in this battle was the larger gun ports of the British ships, which allowed a more flexible training of their armament.

In the earlier history of the capital ship, it was held that the ideal to be attained was invulnerability rather than destructive superiority; more stress was laid upon the armor protection of the vessel than upon the effectiveness and power of its armament. However, the introduction of rifled guns and shells carrying bursting charges of explosives finally overcame the attempts to protect the ship as a whole. Today the armor protection is limited to those parts constituting the vital organs of the vessel.

The importance of the big gun, and the final proof that ship development has been along the right lines, can be found in the two most important modern naval conflicts: the Battle of Tsushima, where the Russian fleet received its main injuries from the Japanese twelve-inch " portmanteaus "; and the recent Jutland fight, where the ranges were such that it was again the large guns that governed the action. Naval tactics have been developed to enable the full gun power of a fleet to be used against an enemy. Gun power has been increased to strike the enemy at long ranges, to out-range him and to gain a moral and physical superiority over him before he can close to shorter distances. Salvo fire has been developed to simultaneous fire of the large guns, and to a delivery of tremendous, crushing blows in such volume and with such rapidity that the enemy has no time to repair his damages.

It is natural that with the evolution of the capital ship, inventors should exercise their ingenuity in the development of weapons to destroy it. This need was recognized many years ago, and developmental work on the submarine may be traced back as far as 1578, work on the submarine mine to 1585, and the first developments of the automobile torpedo to 1864. It has taken years for these weapons to achieve their present position of importance in naval warfare; they were designed and expected to annihilate the capital ship, and yet today, after these many years, they have only limited its potentiality. In spite of the predictions of Sir Percy Scott, the submarine has, in actual battle, proved to be of secondary importance. Even the submarine's most ardent advocates must admit its impotence in the recent Jutland fight. Though Admiral Beatty's squadron ran through a flotilla of German submarines, not a battle cruiser was touched. Yet in the Mediterranean and about England the seas are netted against submarines. Behind these nets the fighting ships of the Allies can rest; outside of them, they must be constantly on the alert. The submarine unquestionably has a moral effect, and this is an important factor in war. In the Jutland fight the automobile torpedo proved more effective in the tubes carried by high-speed surface vessels than in the submerged tubes of the so-called " daylight " torpedo boats; yet in spite of the heroism of the commanders of the destroyers during the daylight, but few torpedoes got home. However, the potentiality of the torpedo made itself felt after dark, and it was for fear of this weapon that Jellicoe kept in leash the grand fleet, and did not press his advantage over Von Scheer.

From this hurried survey of some of the main features of military history, we can get an inkling as to the probable developments of the mechanism of war in the future. It will be many years before there is a weapon to supplant the gun—so many years, that those of this generation need have no doubts that the expenditure of appropriations for capital ships is a sound investment. Artillery, whether it be on land or upon floating platforms, will be the means wherewith we shall batter our enemy. The United States must have these great floating batteries, which will constitute the iron wall of our protection. We must build larger capital ships, in spite of alleged " docking difficulties," and the opposition to the investment of large sums in single fighting units. Though presenting a larger target for torpedo attack, the bigger ship is less vulnerable, for the reason that its structural subdivision is greater and the effect of a submarine explosion is more localized. In the Jutland battle, the *Marlborough,* though torpedoed, was able to continue in action, using her broadsides with great effect. The capital ships should be supplemented by other types of vessels—as the high-speed battle-cruiser, capable of undertaking a running fight with the enemy's battleships, capable of forming the head of the battle line, and constantly maintaining a position of tactical advantage, as did Beatty in the Jutland fight. The commander of slow ships can have but little initiative; he must wait for the thrust of the enemy, and then parry. His opponent plans the battle. In the larger ships we should develop our hitting power to a maximum in the muzzle energy of our guns. The history of naval war has shown that superior armament is the best armor.

The best answer to the submarine is the high-speed motorboat. Whatever development may be made in the motive-power of the submarine, it never can equal the speed of a small surface craft. The surface submarine destroyers could be equipped with types of high explosive shells closely resembling the " mine " fired from the trench mortars in Europe. The detonation of several hundred pounds of high-explosive under water in the close vicinity of a submarine will be one of the most effective means of securing its destruction. As further protection for the floating gun-platforms there will be the torpedo-boat destroyers which have proved so valuable during the present war. For scouting purposes there should be developed a flying-boat, with emphasis on the boat. This flying machine should be capable of operating from, and landing safely on, a rough sea. With their tremendous speed, they would prove far superior to the scouting ship.

The size of the United States Navy can never be determined by the United States—it must always be determined by the other nations. In the Pacific we have a potential adversary, and in the Atlantic a combination of several hostile navies may develop. We have a Pacific and an Atlantic fleet. Separating them lies the Panama Canal: for it is ridiculous to imagine that the Canal will be a short cut for one fleet to reinforce the other in the case of sudden conflict—the welfare of the Nation should not depend upon a few hundred pounds of high explosive, a charge quite sufficient to disable this waterway.

Finally, in regard to future developments, the potentiality of the submarine should be greatly enhanced, by increasing its size, multiplying its torpedo tubes, and firing them in salvos. The difficulty of hitting with the torpedos is due principally to the long period of transit from base to target, and that means that in order to obtain greater certainty of hits, we must fire them " en masse," but always under the control of special sighting instruments. A further development of the submarine by largely increasing its tonnage will be its possible use as a transport. A leading submarine engineer, who has devoted much study to the subject, considers it practicable to construct these vessels up to 600 or 700 feet in length, fitting them with accomodations for transporting troops. While this may not be of such specific interest to us, since we are not considering ourselves as possible invaders, nevertheless it would be of considerable importance should it be made use of by an enemy. It would be an inestimable advantage to any fleet operating against our coasts if its transports possessed the inherent power of protecting themselves by submergence. This would leave the enemy fleet free to use its full offensive power without the hindrance and the burden of protecting helpless troop ships. Thus the enemy would not need a great naval supremacy to attempt the invasion of our shores. It is not likely, however, that the submarine will ever develop into a carrier of large guns, for in order to be an efficient gun-platform, it would have to lose those qualities that make it a successful submersible.

It is fortunate that at last some recognition has been given by the present Congress to aeronautics. Without an adequate aeronautical branch in the army and navy, the nation is blindfolded during a war. The aerial coastal patrol system which I proposed recently has become a reality. Its work will be to supplement the navy in the location of enemy forces. It will be a winged sentry, whose warning will hurry the mobile land forces to meet the enemy's landing operations. For this purpose—always keeping in mind the omnipotence of the gun—we should have hundreds of miles of strategic roads leading to positions available to the enemy for disembarkment. Over these roads, which can be quickly repaired in case of damage from enemy fire, motor-drawn howitzers will operate. These howitzers would fire large-calibre shrapnel upon the landing forces. Squads of motor-bicycle machine-guns would also operate upon those roads and prove their potentiality in checking the enemy.

All the leading nations understand that the key to world power is the command of the seas. Any weapon to limit the potentiality of naval power, such as the wireless torpedo, the submarine, and the mine, will therefore be of paramount interest. Millions of dollars will be spent in the development of these weapons, and it is a paradoxical situation that the nations should be forced to develop instruments that will tend to limit their own naval aggressiveness. Napoleon was beaten by the allied fleets; the resources of Wilhelm II are being cut off by the ships of his enemies. We cannot feel that because our ambitions are not for territorial aggrandizement, sea power has no interest for us. In the present state of industrial development, all nations are interdependent. A blockade of our coast would not starve our citizens, but it would close our factories. It is for this reason that we must have a fleet on both oceans, large enough to meet any enemy and to take the offensive against him. Defensive wars are losing wars.

The great problem in preparedness today is not the matter of how many ships we shall build, nor the number of men that we shall have in our standing army. It is a question of whether a nation of civilians, ignorant of the technical requirements of war, shall have the power to control the development of its means of defense. Every industrial enterprise employs experts, and bases its development upon their opinions and its financial resources. From a survey of the past we have seen how the expert has guided the development of weapons along logical lines and brought them to their present high state of efficiency. Today the War and Navy Departments have far too little influence upon the ultimate development of the service they are supposed to control. In the throes of war, the people's destiny will be thrust into the hands of our admirals and generals. They will be forced to protect us with an equipment in which they have but little confidence, for it will be an equipment produced, in many cases, by political compromises, and not by technical knowledge.

Under the stress of the European war there is a sentiment for preparedness throughout the United States which will probably last until peace is declared. This sentiment has produced an Army and Navy bill. These bills have merely accelerated our military and naval increase to keep pace with the building programmes of certain other countries. The greatest achievement, then, that we could obtain today for the safeguarding of the nation would be in the formation of a council of defense, untouched as far as possible by political influence, and following the consensus of opinion of qualified experts. This council would initiate and perpetuate a policy for the upbuilding of our military and naval forces, so as to maintain a safe balance between our national strength and that of the other Powers. If we leave the upbuilding of our army and navy in the hands of the people, when popular interest wanes we shall find ourselves in 1926 in the same relatively weak position that we occupy in 1916.

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